

REMARKS

Claims 1-14 are pending in the application, as amended. Claim 2 has been amended to more clearly define the length of the guide pins. The amendment to claim 2 is supported in the specification at least at page 7, lines 11-12. Claim 10 has been amended to recite that first and second guide holes are adapted to directly receive the first and second connector guide pins. The amendment to claim 10 is supported in the specification at least at page 8, lines 10-17 and in the drawings at least at Fig. 4B. Fig. 1 has been labeled "Prior Art." Accordingly, no new matter has been added to the application by the amendment.

Formal Matter – Drawings

The Examiner has stated that Fig. 1 should be designated by a legend such as --prior art-- because only that which is old is illustrated. Applicant has labeled Fig. 1 as "Prior Art" as suggested by the Examiner. A replacement sheet with the appropriate change is attached.

Formal Matter - Claim Objection

The Examiner has objected to claim 2 because it is not clear to the Examiner what a range of "about 4 mm to about 5 mm" covers. The Examiner has suggested that Applicant change the range to a "length of $x \text{ mm} \pm y \text{ mm}$ " or the like. Although Applicant contends that original claim 2 is fully compliant with 35 U.S.C. § 112, claim 2 has been amended as suggested by the Examiner.

Claim Rejection - 35 U.S.C. § 102

The Examiner has rejected claim 10 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,412,987 B1 (Horwitz *et al.*). The Examiner states that Horwitz *et al.* teaches a base plate 108 having an opening (not numbered, see Fig. 5 or Fig. 7) mounted to a slotted receptor plate 44 of a microscope. The Examiner further states that Horwitz *et al.* teaches an aperture plate having an aperture 112 (Fig. 6) that locates in the center of the opening of the base plate. The Examiner further states that Horwitz *et al.* teaches a pair of threaded holes 126, 128

that receive fasteners used to hold an optical fiber connector 101 securely on the aperture plate. Applicant respectfully traverses the rejection.

The present invention is directed to a holding fixture 40 for use with an interferometric optical microscope 10. The fixture includes a base plate 42 having an opening 48 that is mounted to the microscope 10 and an aperture plate 50, 150 having an aperture 52 overlapping the base plate opening 48. The fixture 40 is adapted to receive a male or female optical fiber connector 20, 30 having guide pins 22 or guide holes 32, respectively. Optical fibers (see Fig. 1) are located between the guide pins 22 and between the guide holes 32. In order for the optical connectors 20, 30 to properly work together, the optical fibers from each connector 20, 30 must be aligned with each other. For this to happen, the contact surfaces (see Fig. 1) of the connectors 20, 30 must not form an angle too large because the optical fibers could not align with each other. The purpose of the present invention is to measure dimensional characteristics of optical fiber connector contact surface to determine the angle that would be formed between the measured optical fiber connector 20, 30 and its mate. During measurement, the aperture plate 50, 150 acts as the opposite mating connector. The fixture 40 allows the optical fiber connector 20, 30 to be held in a precise and repeatable orientation relative to the microscope 10 to facilitate accurate and precise measurements of dimensional characteristics of the optical fiber connector 20, 30.

With respect to claim 10, the fixture 40 is adapted to receive an optical fiber connector 30 having first and second guide holes 32 (a female connector). The aperture plate 50 in this aspect includes first and second guide pins 54a, 54b adapted to fit within the connector guide holes 32.

Horwitz *et al.* discloses an adapter system usable in conjunction with a fiberoptic termination inspection microscope 30 to inspect fiberoptic cables and connectors. The purpose of the microscope 30 is to inspect a cable end 104 to determine if such is clean and polished in order to ensure low attenuation levels. The microscope 30 is housed within a housing 32 that is connected to a female adapter 44. The female adapter 44 includes a base plate 46 which is fixedly mounted by screws 48 to the housing 32. The base plate 46 has a groove 58 (best seen in Fig. 1) that slidably receives a plate 108. The plate 108 includes an opening for receiving a member 110. The member 110 is fixed to the plate 108 by a pair of screws 114 and includes an

aperture 112. Referring to Figs. 5-7, a fiberoptic ribbon connector 101 having an end 104 is secured to a ribbon connector mount 109 which is further secured to the member 110 via screws and threaded holes 126, 128. The member 110 is then secured to the remaining structure via the screws 114.

Claim 10, as amended, recites, among other things:

a base plate mountable to the microscope and having an opening sized to receive the optical fiber connector;

an aperture plate connected to the base plate, the aperture plate having an aperture overlapping the base plate opening;

an aperture plate mounted to the base plate, the aperture plate having an aperture overlapping the base plate opening;

the aperture plate further including first and second guide holes adapted to directly receive the first and second connector guide pins therein, respectively,

wherein the fixture allows the optical fiber connector to be held in a precise and repeatable orientation relative to the microscope in turn facilitating accurate and precise measurements of dimensional characteristics of the optical fiber connector.

Horwitz *et al.* does not disclose an aperture plate having first and second guide holes adapted to directly receive first and second connector guide pins. Assuming that the aperture plate of the present invention corresponds with the member 110, as suggested by the Examiner, then the member 110 does not include first and second guide holes directly receiving first and second connector guide pins. The holes 116 receive screws 114, not connector guide pins. There is only one fiberoptic element 104 in Horowitz, *et al.* that fits within a single hole 112. Therefore, Horowitz *et al.* does not disclose two guide holes that receive two guide pins.

Similarly, if one were to consider that the plate 108 corresponds to the aperture plate 150 of the present invention, Horwitz *et al.* still does not disclose first and second guide holes adapted to directly receive first and second connector guide pins. Although the plate 108

includes holes, they are not adapted to receive connector guide pins. Instead, the holes are adapted to receive only the screws 114. Thus, the holes of the plate 108 are not adapted to directly receive the connector 101.

Thus, in either scenario, Horwitz *et al.* does not disclose each and every element of claim 10. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

Claim Rejection - 35 U.S.C. § 103

The Examiner has rejected claims 1, 5, 6 and 8 under 35 U.S.C. § 103(a) as being unpatentable over Horwitz *et al.* The Examiner has stated that Horwitz *et al.* teaches a base plate 108 having an opening (not numbered, see Fig. 5 or Fig. 7) mounted to a slotted receptor plate 44 of a microscope. The Examiner further states that Horwitz *et al.* teaches an aperture plate having an aperture 112 (Fig. 6) that locates in the center of the opening of the base plate. The Examiner admits that Horwitz *et al.* does not teach a pair of guide pins included on the aperture plate. Instead, the Examiner states that Horwitz *et al.* teaches a pair of cylindrical fasteners 114 parallel to each other and perpendicular to an upper surface of the aperture plate used to hold an optical fiber connector 101 securely on the aperture plate in threaded holes 126, 128. The Examiner states that the fasteners are not permanent parts of the aperture plate, but it would have been obvious to one having ordinary skill in the art at the time the invention was made to integrate them on the aperture plate since it has been held that the use of one piece construction instead of the structure disclosed in the prior art would be merely a matter of obvious engineering choice. Furthermore, the Examiner states that the motivation can be to reduce the number of working parts or to reduce the overall cost of manufacturing the fixture. Applicants respectfully traverse the rejection.

The fixture 40 is adapted to receive an optical fiber connector 20 having first and second guide pins 22 (a male connector). The aperture plate 150 includes first and second guide holes 154a, 154b adapted to directly receive the first and second connector guide pins 22 therein, respectively.

Referring to M.P.E.P. § 2143, a prior art reference must teach or suggest all the claim limitations to establish a prima facie case of obviousness. When combining prior art references,

the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ 2d 1438 (Fed. Cir. 1991).

Claim 1 is directed to a holding fixture adapted to receive an optical fiber connector having first and second guide holes (a female connector). Claim 1 recites, among other things:

a base plate mountable to the microscope and having an opening sized to receive the optical fiber connector;

an aperture plate connected to the base plate, the aperture plate having an aperture overlapping the base plate opening;

the aperture plate further including first and second guide pins adapted to fit within the connector guide holes when the optical fiber connector is received within the base plate opening,

wherein the fixture allows the optical fiber connector to be held in a precise and repeatable orientation relative to the microscope in turn facilitating accurate and precise measurements of dimensional characteristics of the optical fiber connector.

Even if Horwitz *et al.* were modified so that the fasteners 114 were made integral with the aperture plate, it would still fail to disclose each and every element of claim 1. That is, the modified prior art still would not include a base plate mountable to the microscope and having an opening sized to receive the optical fiber connector. Since the openings (not numbered, see Fig. 5 or Fig. 7) of the base plate 108 of Horowitz *et al.* would be filled with integral fasteners, the base plate 108 would be without any external openings. Thus, the base plate would not have an opening sized to receive the optical fiber connector. Nowhere in Horwitz *et al.* is the above underlined language of claim 1 disclosed or suggested. Since the modified Horwitz *et al.* device does not disclose all of the claim limitations of claim 1, the rejection of claim 1 is improper.

Thus, claim 1 is patentable at least because Horwitz *et al.* does not show a base plate having an opening sized to receive an optical fiber connector. Claims 5, 6 and 8 are dependent on claim 1 and are patentable for the same reasons set forth above with respect to claim 1.

Reconsideration and withdrawal of the rejection of claims 1, 5, 6 and 8 are respectfully requested.

The Examiner has rejected claims 3, 4 and 11 under 35 U.S.C. § 103(a) as being unpatentable over Horwitz *et al.* The Examiner states that it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a material for the base plate, aperture plate and guide pins having properties best fitted for this application and that the motivation of using a material such as carbide or stainless steel can be to extend overall lifetime of the fixture because such materials are more wear-resistant than plastic or wood. Applicant respectfully traverses the rejection.

Claims 3 and 4 are dependent on claim 1 and are patentable for the same reasons set forth above with respect to claim 1. Claim 11 is dependent on claim 10 and is patentable for the same reasons set forth above with respect to claim 10. Reconsideration and withdrawal of the rejection of claims 3, 4 and 11 are respectfully requested.

The Examiner has rejected claim 7 under 35 U.S.C. § 103(a) as being unpatentable over Horowitz *et al.* The Examiner states that Horowitz *et al.* teaches the claimed invention except for a predetermined angular offset of the guide pins and that it would have been obvious to offset the effects of the angle by tilting the guidepins so that a microscope can still focus on the ends of said optical fiber connector. Applicant respectfully traverses the rejection.

Claim 7 is dependent on claim 1 and is patentable for the same reasons set forth above with respect to claim 1. Reconsideration and withdrawal of the rejection of claim 7 are respectfully requested.

The Examiner has rejected claim 9 under 35 U.S.C. § 103(a) as being unpatentable over Horowitz *et al.* in view of U.S. Patent Application Publication No. 2004/0045509A1. The Examiner states that Horowitz *et al.* discloses a claimed invention except for the relief cut into a middle portion of the guide pins and teaches a relief region 236 formed on a shaft or a lift pin that moves through a guide hole 118. It is further stated by the Examiner that it would have been obvious to a person with ordinary skill in the art at the time the invention was made to create a relief portion on the guidepin and that this combination reduces overall contacting areas and

friction forces between the pin and the hole and makes insertion and removal of the pins an easier process. Applicant respectfully traverses the rejection.

Claim 9 is dependent on claim 1 and is patentable for the same reasons set forth above with respect to claim 1. Reconsideration and withdrawal of the rejection of claim 9 are respectfully requested.

The Examiner has rejected claim 12 under 35 U.S.C. § 103(a) as being unpatentable over Horwitz *et al.* The Examiner states that claim 12 teaches the first two parts of the method by which the apparatus disclosed in claim 1 is operated and that the method is inherent to the apparatus and also considered unpatentable. The Examiner states that it would have been obvious for a person with ordinary skill in the art at the time the invention was made to operate the microscope to obtain dimensional characteristics of the optical fiber connector since such an operation is "conventional in the art of multi-fiber optical connectors, and are obtained in a manner well known in the art." Applicant respectfully traverses the rejection.

The method of the instant application includes steps of providing an interferometric microscope having a holding fixture connected thereto, the fixture being adapted to receive and hold, in a fixed, repeatable orientation, the optical connector, installing the optical fiber connector and the fixture in a first orientation, and measuring three dimensional characteristics of the optical fiber connector.

Claim 12 is directed to a method of measuring dimensional characteristics of an optical fiber connector with an interferometric microscope. Interferometry is used for measuring the surface of a multiple fiber optical connector because the resulting fringe pattern provides three-dimensional (3-D) information about the surface of the connector (page 2 line 25-page 3 line 2). claim 12 recites, among other things:

. . . providing an interferometric microscope having a holding
fixture connected thereto, the fixture being adapted to receive and
hold, in a fixed, repeatable orientation, the optical connector . . .

The above language of claim 12 distinguishes over Horwitz *et al.* under § 103 because Horwitz *et al.* does not teach or suggest providing an interferometric microscope for 3-D

measurements. Instead, Horwitz *et al.* describes only an inspection microscope used for surface inspection (col. 1, lines 8-11). In other words, the inspection microscope in Horwitz *et al.* is for measuring only a two-dimensional surface. The present invention, on the other hand, uses an interferometric microscope that provides 3-D information of the viewed area, including height measurements. Nowhere in Horwitz *et al.* is an interferometric microscope capable of taking 3-D measurements disclosed or suggested. Since Horwitz *et al.* does not teach or suggest all of the claim limitations of claim 12, a prima facie case of obviousness cannot be met.

Thus, claim 12 is patentable at least because Horwitz *et al.* does not teach or suggest an interferometric microscope having a holding fixture connected thereto. Reconsideration and withdrawal of the rejection of claim 12 are respectfully requested.

Allowable Subject Matter

Applicant appreciates Examiner's willingness to allow claims 13 and 14. However, it is respectfully submitted that claims 1-12 are also allowable.

CONCLUSION

In view of the above Amendment and remarks, it is respectfully submitted that the present application, including claims 1-14, is in condition for allowance.

Respectfully submitted,

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Amendments to the Drawings

Fig. 1 has been labeled as "Prior Art." Please replace sheet 1 of the drawings with the attached replacement sheet.